

The surface brightness of dwarf stars and subgiants

The light emitted by stars is very similar to that of a **black body**:

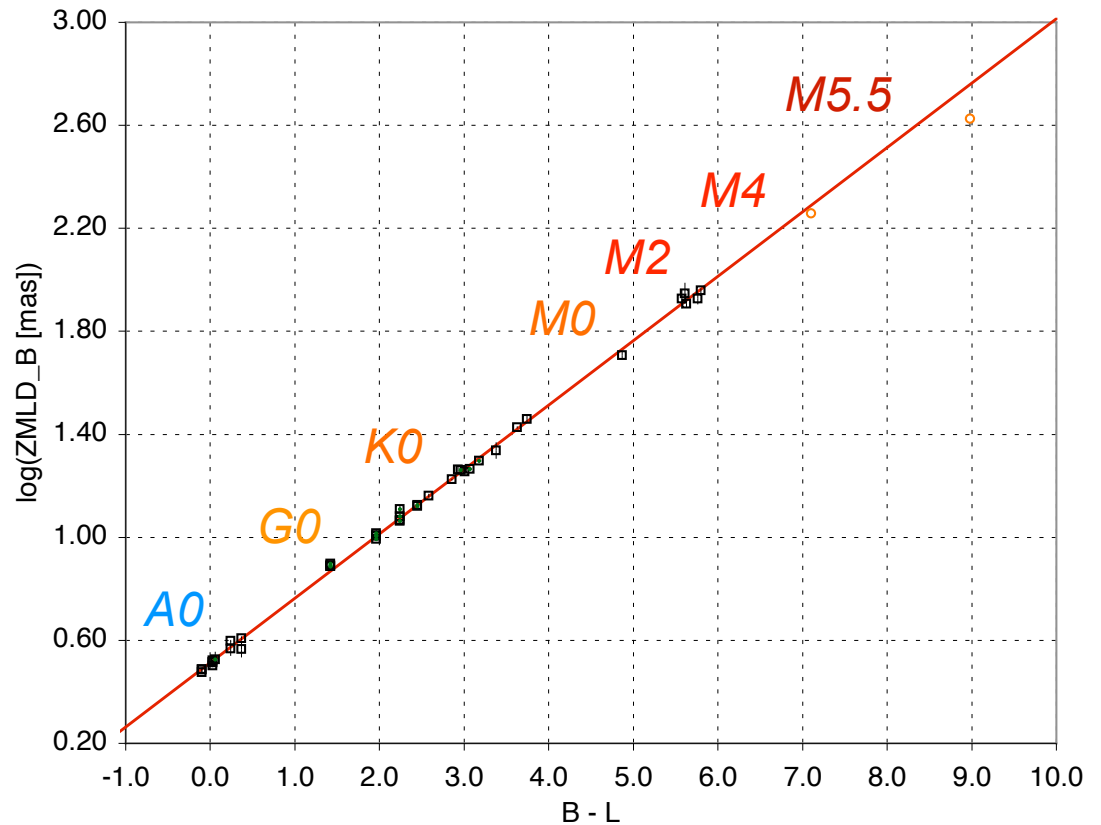
$$f \sim L / R^2 \sim T^4$$

$$F_B = a (B-L) + b$$

$$F_B = 4.2207 - 0.1 B - 0.5 \log (LD)$$

The limb darkened **angular diameter LD** follows for instance the relation of the form:

$$\log LD = c (B-L) + d - 0.2 B$$



- These relations are useful to predict the angular diameter of nearby dwarf stars (spectral types from A0 to M2) **with an accuracy of +/- 1%** from broadband photometry
- **Nearby dwarf stars are excellent calibrators for interferometry:** small size, negligible extinction, well known (photometry, spectroscopy), relatively stable in average

Examples of predictions:

HD209458 : $LD = 0.228 \pm 0.004 \text{ mas}$

$R = 1.154 \pm 0.059 R_{\text{sun}}$ (transit : $1.146 \pm 0.050 R_{\text{sun}}$)

51 Peg A : $LD = 0.689 \pm 0.011 \text{ mas}$

$R = 1.138 \pm 0.023 R_{\text{sun}}$

Kervella, Thévenin, Di Folco , Ségransan, A&A, **426**, 297 (2004)